PART 611-4: NEEDS ANALYSIS

4-1 DEFINING TRANSPORTATION NEEDS

Methods

Transportation planners collect data from a variety of sources to assess current and future travel needs to which the transportation system should respond These methods range from complex mathematical models which estimate future travel demand, to neighborhood meetings to discuss transportation services available and desired by residents. Rhode Island's statewide transportation planning includes many of these processes, and places a strong emphasis on involvement of the public in the needs assessment and decision-making processes. Inputs to the needs assessment for this plan include:

- a Transportation Advisory Committee (TAC), comprised of representatives of state agencies, local governments, regional organizations, transportation system providers and users, private organizations, and citizens having an interest or expertise in transportation matters. This group meets monthly, is directly involved in preparing the Ground Transportation Plan and Transportation Improvement Program, and advises the State Planning Council on all transportation-related matters.
- public surveys, meetings, workshops, and forums held throughout the state which provide opportunities for citizens and officials to offer comments concerning travel needs and transportation issues. A public survey and a televised "Town Meeting" on transportation issues were conducted in 1997. For the 2001 plan update, four regional public meetings, and four statewide public forums on specific issues were held. In addition, a special effort was made to expand outreach to minority and low income populations.
- a statewide travel demand model that uses socio-economic and travel survey data to mathematically estimate current and future travel patterns.
- data, studies and analyses of system operations and needs compiled by state transportation operating agencies.

Major sources used in assessing Rhode Island's transportation needs are described below.

Outreach on Transportation Equity Issues

Transportation is a fundamental element in the quest for equality of opportunity. Access to reliable means of transportation is essential to each individual's quality of life, financial security and freedom of movement.

Inequities in the transportation system can exist as differentials in the levels of ***benefits*** (availability or accessibility to facilities, levels of service, investments in transportation systems) provided to different population groups; or in the degree of ***burdens*** (negative impacts of transportation such as inability to access services and jobs, degradation of air quality, noise levels, impacts on water quality, pollution, disruption to communities, etc.) that different communities or geographic areas are called upon to shoulder. Under federal law (Civil Rights Act of 1964) federal agencies have an obligation to avoid discrimination in the distribution of federal resources and benefits. Executive Order 12898 (Environmental Justice) additionally charges agencies with identifying and addressing, as appropriate, *"disproportionately high and adverse human health or environmental effects"* of their programs, policies, and activities on minority populations and low-income populations.

The first step in assessing equity in the distribution of the benefits and burdens of the transportation system, and in avoiding or correcting disproportionately high impacts is to insure that all groups are adequately involved in the transportation planning and decision-making processes. Although public participation has been a hallmark of Rhode Island's statewide transportation planning process, it is recognized that traditional outreach and needs assessment processes may not successfully engage all citizens and communities having a stake in transportation issues, and therefore may not adequately reflect the transportation needs of all citizens. "Gaps" may particularly affect low income and minority populations whose participation in traditional forums can be limited by a lack of information, constraints on the time, mobility and resources of groups, and, in some instances, cultural and language barriers.

For this update of the plan, a special effort was made to identify, reach out to, and engage low income and minority populations within the state's largest urban city, Providence. This was done as a cooperative project with The Providence Plan, a non-profit, community-based organization, and was undertaken to broaden the plan's needs assessment, and to serve as a pilot study for future efforts elsewhere in the state.

This effort had several goals:

- To begin a process of enfranchising low income and minority groups who ordinarily do not have easy access to, or adequate information on, the state's transportation planning and decision-making processes,
- To gain a better understanding of the transportation needs of lower income residents within Providence, the state's largest city,
- To develop additional input to the state's transportation planning process for use in updating the ground transportation plan, and
- To develop a model for application within other areas of Rhode Island.

The Providence Plan prepared demographic profiles of Providence neighborhoods to identify areas with high concentrations of low income and non-white residents. Data series included Census 2000 population and race data, and locally-assembled data, such as birth records, school enrollment data, and public assistance program (Family Independence Program) caseload data. Transit ridership data and the results of a RIPTA on-board origin-destination survey were also analyzed on a neighborhood basis, as were accident location data provided by RIDOT. Vehicle ownership and availability data collected through the Family Independence Program were also assessed on a neighborhood basis.

A steering committee of staff from state planning, transportation, and human service agencies, City of Providence planning staff, and Providence Plan staff guided the effort and

used the data collected to select specific constituent groups who were potentially transportation--disadvantaged and would be targeted for outreach. The groups identified were low income, minority, elderly, disabled, youth, ethnic groups, single parents, job placement program clients, and families with children.

Twelve facilitated focus groups were arranged through community-based organizations selected to engage the targeted constituent groups. Meeting locations were selected through consultation with community-based agencies, and were designed to be as convenient to the sought-after participant groups as possible. Community centers, ethnic minority/recent immigrant community development agencies, employment placement service sites, senior centers, and public housing activity centers, were selected as venues, and special arrangements were made to provide for child care.

Numerous comments were heard concerning the difficulties individuals and families who lack access to an automobile, or who are transit-dependant for another reason, have meeting their daily requirements (work, shopping, school, etc.). Specific concerns ranged from dissatisfaction with transit schedules and headways (particularly the limited evening and weekend schedules) to issues of security and personal safety while waiting at bus stops. Other issues mentioned related to pedestrian safety concerns (poor condition of sidewalks, lack of enforcement of ice and snow removal ordinances, need for traffic calming), the difficulties some encounter in accessing information on transit routes or schedules, and the need for ensuring that minority, elderly, and disabled transit customers are treated with courtesy and respect by transit drivers. Roadway conditions were cited by some participants, especially regarding poor signage, surface conditions, and inefficient snow removal.

The input from all focus groups was summarized and a series of general and specific recommendations presented by The Providence Plan to address the transportation needs of low income, minority, and other transportation-disadvantaged groups. These findings and recommendations were presented at the public forum held by the Transportation Advisory Committee's Subcommittee on Transportation Equity and Environmental Justice, were endorsed by the Subcommittee, and are reflected in the goals, policies (Part 5) and recommendations (Part 7) of the plan.

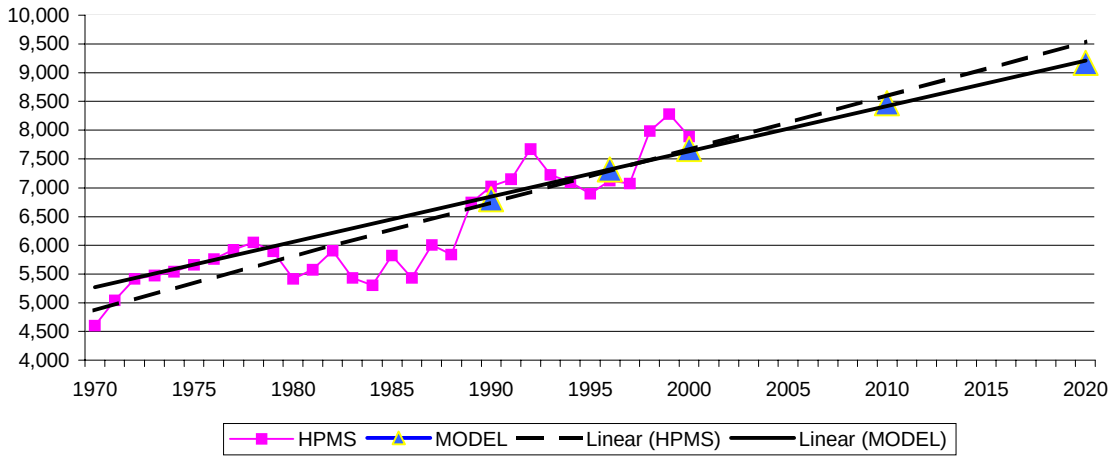
Statewide Travel Model

A statewide travel demand model is used to evaluate the transportation system in Rhode Island. This model uses socio-economic data developed by the Statewide Planning Program (population and employment forecasts), together with vehicle trip data collected by RIDOT (HPMS traffic counts), and formulas based on nationally-accepted standard practices to project future travel on the state's roadways. The following system-wide indicators of travel result from this effort.

Travel Indicator	2000	2010	2020
Daily number of trips	4,163,143	4,468,156	4,850,226
Daily vehicle miles of travel (VMT)	21,022,486	23,209,408	25,119,339
Daily vehicle hours of travel	1,067,250	1,209,323	1,366,710
Average trip length (miles)	8.37	8.56	8.60
Average trip time (min:sec)	24:03	25:14	26:05
Average vehicles speed (mph)	20.89	20.43	19.8

This indicates that there will be moderate growth in travel. Travel is expected to increase along with population and employment. The figure below shows model VMT compared to Highway Performance Monitoring System (HPMS) VMT. HPMS and model growth are consistent. Reapprasial of travel demand forecasts will take place prior to the next update (2004) of this plan, and will benefit from updated socio-economic and population projections based upon detailed data from the 2000 Census Transportation Planning Package (CTPP), which is anticipated to be available in late 2001 or 2002.

HISTORICAL AND PROJECTED ANNUAL VMT



The model also indicates that average trip length will increase slightly. This is due to continuing movement of population to suburban and rural Rhode Island. Average travel time is forecast to increase slightly, due to two factors: dispersion of development and increasing congestion. A better indicator of congestion is average vehicle speed, which is expected to decrease slightly.

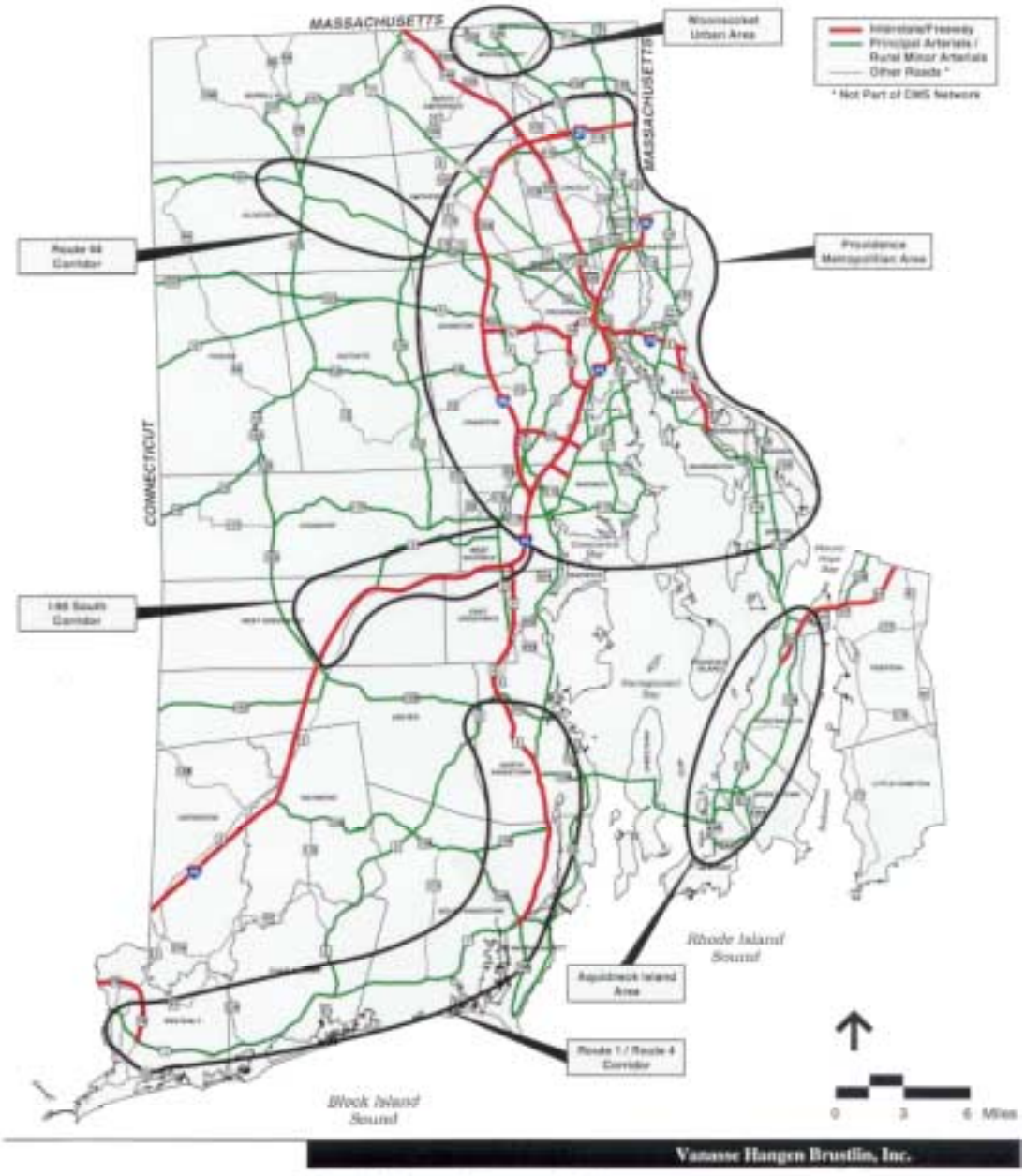
Overall, the level of travel is not anticipated to change dramatically. There will be more travel, with individuals traveling somewhat farther. Congestion will cause travel to take slightly longer. On a system-wide basis, there is no major reason for concern about congestion.

However, this does not mean that there will not be areas of congestion or that an individual will not experience congestion. Many individuals will experience trips that will be relatively free-moving for most of their length, but then encounter a short length of congestion. These conditions can be expected to occur mostly during peak travel hours and primarily when there is an incident such as highway construction or an accident. It will become more important to clear accidents from roadways as quickly as possible.

Congestion Management System

RIDOT has performed a preliminary study on congestion management, as part of its development of a Congestion Management System. This study identified potential congested areas or corridors (see figure below). It should be noted that within the large urban areas shown, it will be the Interstate highways and arterials, not all roads in an area, that will be congested. Again, congestion will occur during peak hours and when traffic incidents reduce the width of highway available for travel.

The purposes of a Congestion Management System (CMS) are to identify areas of congestion and to identify and evaluate strategies and projects to manage, and/or reduce, the level of congestion within those areas. RIDOT developed a CMS in response to a mandate of ISTEA. The CMS, which was developed in concert with efforts to implement Intelligent Transportation Technologies within the state, has been approved by the Federal Highway Administration. Having an approved CMS is important to the state because under federal law, in an air quality non-attainment area, no project that increases the capacity of a roadway for single-occupant automobiles can be built with federal funds unless it comes from an approved CMS. Thus, the CMS is an important source of projects for implementation in the Transportation Improvement Program.



Potential Congested Areas or Corridors

The congestion management study identified roadways where congestion may now be a problem and where there is a potential for congestion in the future. This initial study only surveyed roadways to determine those likely to be a problem. It did not examine in detail causes and solutions for congestion on particular roadways. However, the results do indicate where additional study is appropriate.

It is not a given that capacity must be added by widening roadways wherever congestion might occur. On the contrary, other less intrusive and less costly alternatives must be considered first. Adding lanes is a last resort. In some cases, it may be determined that the level of congestion is acceptable and nothing should be done. For example, in a historic or scenic area, living with congestion might be better than living with a solution.

The initial study identified congested roadways by considering reductions in speed that occur. While speed is an indication of congestion, future studies need to look at overall travel time in corridors. Consider a 20-mile commute with 19 miles traveled at 60 mph and one mile traveled at 30 mph. Total travel time would be 21 minutes. Increasing capacity on the one mile section, so that speed increased to 60 mph, would reduce total travel time to 20 minutes. The cost and impacts of necessary improvements must be weighed against the number of people who would save one minute. Another consideration is the traffic impact of improving capacity on one highway segment. In some cases improving speed on one highway segment might only move congestion to the next segment, with no overall travel time savings.

Future studies must therefore focus on corridors and overall travel time. Improvements such as traffic and incident management through the RIDOT Transportation Management Center (TMC), improvements to signalized intersections, and improved transit service and travel demand management measures are likely to be beneficial in many areas. After these types of improvements are considered, roadway widening may still be appropriate in some areas.

The RIDOT study identified the following roadways as having existing peak-hour congestion:

Limited-Access Highways

I-95 (RI-102 to RI-122)
I-195 (entire length)
I-295 (RI-37 to US-6)
US-6 (I-95 to RI-10)
RI-10 (entire length)
RI-146 (RI-99 to RI-246)
Airport Connector (entire length)

Other Highways

East Bay
- RI-114
- RI-103
- US-6

Providence metropolitan area
- RI-5
- US-44
- RI-15

Woonsocket area
- Park Avenue
- RI-122

Aquidneck Island
- RI-114
- RI-138A
- RI-214
- Coddington Highway

- US-1A
- RI-117
- RI-114

Washington County
- US-1
- RI-4

The RIDOT report also identified some areas of off-peak congestion. The majority are within the Providence metropolitan area, although pockets of congestion were identified on Aquidneck Island and in Washington County.

Seasonal congestion was also noted in some areas, not on limited-access highways but on the following roadways in Washington County and Newport:

RI-4
US-1
RI-108
RI-114
RI-138
RI-214
RI-238

The study made an effort to identify future (2020) peak congestion. It projected a modest increase in the number of congested roadways . The major changes were the addition of nearly all of I-95 and some arterials in Washington County. In addition to areas identified in the RIDOT study, increasing congestion has been noted in the RI-4 corridor between RI-102 & RI-95 according to local reports.

The next step should be a more detailed analysis of the corridors served by these identified roadways. Many are included in the current Transportation Improvement Program. Others, particularly in the Newport area, will be addressed as part of the RIDOT traffic/safety program. Again, it is important that these projects be considered in a corridor analysis, not as separate projects.

Intermodal Transportation

In connection with the 2001 Plan update, the Transportation Advisory Committee appointed an *ad hoc* Intermodal Transportation Subcommittee to review intermodal transportation issues in the plan. The Subcommittee held a series of meetings in Newport and Providence, and conducted a Public Forum on Intermodal Transporation at the (Intermodal) Gateway Transportation and Visitors' Center in Newport.

The Subcommittee defined Intermodal Transportation as follows:

> *Intermodal transportation promotes seamless and efficient linkages, interactions and movements between different transportation modes.*

It recommended that, as a goal, Rhode Island's transportation system emphasize seamless intermodal connections at all major transfer points to facilitate the movements of passengers and goods, encourage alternatives to the single occupant automobile, and promote tourism within the state.

The Subcommittee also outlined the following principles for development of intermodal transportation in the state:

Intermodal connections include:

- land, sea and air goods movements
- commuter, recreational, and tourist passenger movements
- multiple use of transportation facilities
- corridors leading to the connection

Intermodal connections should:

- encourage economic development
- be fully integrated into the transportation planning process
- focus on convenience and reliability of mass transit
- improve connections between and within urban and suburban communities
- enhance transportation programs and systems
- be well signed both internally and externally

The Subcommittee recommended that the Ground Transportation Plan include assertive policies to encourage implementation of an intermodal transportation system as an alternative to single occupancy vehicle usage. The subcommittee found that tourism can be a key impetus for creating an intermodal system which benefits not only those who visit Rhode Island, but those of us who live and work in the state.

Other recommendations made by the Subcommittee include:

- Integrating intermodal transportation fully within the transportation delivery system;
- Studying intermodal aspects of transportation demand;
- Including intermodal options in the planning process for transportation corridors;
- Coordinating among all stakeholders to ensure the best operation of intermodal projects; and
- Including signage as a critical element in intermodal projects and in the state as a whole. Clear signage is needed for smooth transitions between modes in an intermodal station and travel between transportation modes and destinations in the state. Directional signage and information should be developed with the visitor in mind.

Pedestrian Travel Needs

Walking is the most basic form of human transportation. Everyone is a pedestrian including persons using wheelchairs and other forms of mobility assistance. Transit and automobile trips begin and end with a walk. Walking is often the best way to accomplish short trips in urban areas. Almost everyone relies on walking to get to where they want to go each day.

The benefits of walking to the transportation system include reductions in:

- traffic congestion,
- emission of conventional and toxic air pollutants and greenhouse gases,
- noise pollution,
- wear and tear on roads,
- petroleum consumption
- crashes and property damage, and
- the need for additional roads, travel lanes and parking, preserving more greenspaces.

Walking also supports improvement in indicies of individual health and well-being through regular exercise.

Providing walkways also helps meet the needs of a larger segment of the population who do not have access to an automobile — the transportation disadvantaged: low-income individuals, the young, the elderly, persons using wheelchairs and others with disabilities, and others who do not use a motor vehicle for a variety of reasons. Walkways help create opportunities for these groups to participate in the social, cultural and economic life of the community.

For many decades, automotive, not pedestrian travel has been the focus of improvement of the transportation system. Traffic engineers and planners, faced the problems of rapid growth, and were pressed to devise ways to ease vehicular traffic congestion. While pedestrian safety was always considered, few highway improvements designed to accommodate vehicles successfully provided an accommodating environment for pedestrians.

Pedestrian-oriented planning suggests a change of focus. Instead of allowing pedestrian improvements to be a by-product of efforts to deal with vehicular traffic in a safe manner, pedestrian planning requires concurrent concentration on the needs of the pedestrian. It asks first, "*What does a pedestrian need to walk safely and pleasantly in the community?"* Once determined, those needs are measured against the very real, practical limitations imposed by a busy system of streets and highways. Pedestrian planning does not demand that the needs of motorists be ignored. Rather it requires that the needs of pedestrians be given equal consideration. Recent public interest in designing "walkable communities" may indicate that the time has arrived when greater balance will begin to be evidenced between accommodations made for vehicles and those provided for pedestrians.

In 2000, a pedestrian safety plan was drafted by the RI Department of Transportation to inform state and local agencies, the private sector, and individuals how transportation policy, planning and practice can be integrated to better meet the walking needs of residents and visitors. The draft plan encourages strong local initiatives in identifying, planning, prioritizing, and funding pedestrian improvements because most walking trips are local.

The plan's analysis of pedestrian safety issues documented the following:

For the seven year period (1993-1999) analyzed:

- 2,049 pedestrians were involved in accidents in Rhode Island, an average of 341 pedestrians involved in crashes each year.
- 3.8% of all pedestrian crashes resulted in a fatality. A total of 94 fatal pedestrian crashes were recorded, for an average of 13 pedestrians killed each year.
- Rhode Island had 1.14 fatalities per 100,000 residents, while the national average was 1.93 fatalities per 100,000 residents (1998 Traffic Safety Facts).
- Rhode Island had the 23rd lowest pedestrian fatality rate in the United States in 1996. In 1997 and in 1998 Rhode Island had the lowest rate in the United States.
- A growing pedestrian safety problem is the incidence of alcohol involvement in a fatal pedestrian crash. Of all U.S. pedestrian deaths, 22.1% involved drinking by the pedestrian. About 25% of the pedestrian fatalities in Rhode Island exceeded the .08 standard and about 20% exceeded the .10 standard.

The plan also examined the status of pedestrian facilities, and characterized obstacles to pedestrian travel:

- Of Rhode Island's 1,200+ state roadway miles, only about 400 miles have sidewalks. The majority of sidewalks are in older urban areas.
- Many of the existing sidewalk facilities do not comply with the requirements of the Americans with Disabilities Act (ADA). Excessive slopes, obstructions, inadequate widths, and poor surface condition typically characterize sidewalks. Most existing sidewalk facilities will require some level of renovation to achieve compliance with ADA.

The plan identified a number of issues that impact on pedestrian travel and safety,

including:

- *Land Use and Density:* Land use practices have resulted in long distances between origin and destination points, requiring an automobile.

- *Lack of Pedestrian Access:* Walking is not considered a viable access mode. Most shopping malls, office complexes, or other public spaces built in the last four decades are located well off the street with ample parking in front, but with no pedestrian access, even though there may be considerable latent demand.

- *Transit Interface:* Transit use is highly dependent on pedestrian access. The adjacent land use must also be conducive to transit use. Bus stops located in areas where the wait is unpleasant, with inadequate protection from the weather, are not conducive transit use.

- *Sidewalk/Design and construction**:*** Sidewalks tend be a lower priority when it comes to allocating limited transportation funds and are often considered optional in roadway projects, included only if a city or town requests them and if space and funds permit.

  - *Project Downsizing*: Because of the cost of reconstruction projects, the State Transportation Improvement Program emphasizes less expensive roadway resurfacing in lieu of reconstruction projects. Such projects include curb and sidewalk repair only where sidewalks already exist, and address ADA requirements along the corridor; but no detailed pedestrian safety analysis is performed.

  - *Roadway Design:* During the last fifty years, many arterials and collector streets have been built (or rebuilt to higher standards) to accommodate higher vehicle volumes and turning movements. Three to five lane streets pose significant barriers to pedestrians.

  - *Disconnected Streets:* Disconnected streets and cul-de-sacs, the typical development pattern of the past fifty years, create long travel distances, even though the direct distance from origin to destination may be fairly short, making walking impractical.

  - *Intersections:* Intersections built for the movement of motor vehicles can be very difficult for pedestrians to cross. A network of streets with sidewalks and bike lanes does not fully accommodate pedestrians and bicyclists if the intersection presents obstacles.

The RIDOT Pedestrian Safety Plan recommends a number of goals, policies, and strategies, many of which have been incorporated into this plan. Following development of the draft RIDOT plan, the Pedestrian Safety Advisory Committee brought a number of public agencies and private organizations together in the planning of Rhode Island's first Walkable Communities Conference, held in March, 2001. Over 200 interested participants conferred on strategies to improve the walking environments of the state's communities.

Planning Process Needs – Travel Corridors

As part of the 2001 plan update, a Subcommittee of the Transportation Advisory Committee was charged with assessing the desirability of developing a "travel corridor" approach as a component of the state's transportation planning process. The Subcommittee found that a travel corridor approach to transportation planning would allow Rhode Island to better integrate its project level planning efforts with statewide plans and policies.

The Subcommittee defined a transportation corridor as "a transportation pathway that provides for the flow of people and goods within and between activity centers, and that includes one or more primary transportation facilities and the abutting land uses and supporting street network". The Subcommittee recommended that a corridor planning process be adopted by the State and should incorporate the following five basic components:

- *Coordination* – improving linkages across the various agencies and institutions that have a role in advancing corridor management objectives.
- *Transportation* – planning, design, operations, capital improvements, and regulatory techniques for preserving or improving the function and performance of transportation systems.
- *Land use* – planning, design, and regulatory techniques for managing land use and development outcomes.
- *Public involvement* – outreach, communication, and involvement strategies for improving public participation in corridor management activities.
- *Funding* – identifying a variety of funding sources or other resources both public and private, and institutional arrangements for carrying out needed studies and improvements.

The overall objectives of corridor planning would include development of corridor management strategies to:

- promote improved regional coordination on land use and transportation issues along travel corridors;
- preserve the safety and operational efficiency of corridor primary roadways through access management;
- encourage the establishment of effective land use or growth management plans for corridors;
- prevent or minimize development within the pathway of planned transportation facilities;
- promote development of supporting street, sidewalk, and site circulation systems where land development is desired;

- apply design, regulatory, and funding strategies to retrofit or revitalize older developed areas; and
- address site-by-site development impacts on corridor capacity through traffic impact assessment and developer mitigation.

A corridor level approach would involve examination of roadways, rail, transit, pedestrian and bicycle facilities, water and air transportation access, draw upon the travel demand modeling, congestion studies, and other needs analyses done previously at the statewide level, and add other key factors (such as land use) to collaboratively develop projects that address the major transportation problems of the state. Corridor planning would consider how Rhode Island "fits" into the transportation systems in the interstate region of New England and the Northeastern United States. Similarly, intrastate regional issues would be integrated to better coordinate local community transportation concerns with the State's regional transportation concerns.

Recognizing that transportation and land uses are intrinsically intertwined, corridor planning would also enable statewide transportation policies to be considered in a proactive land use/land management planning effort that extends beyond individual municipal boundaries. The State's Congestion Management planning process would also be integrated with the travel corridor planning process. Corridor plans would be developed through a team approach with representation of all relevant state interests, local communities, businesses, citizen advocacy and concerned citizens. They would set major objectives, performance goals, and principles to guide and coordinate the development and execution of individual transportation projects undertaken within each corridor. Upon completion of major corridor level plans, they would be incorporated into the State Guide Plan. The state would then work closely with local governments to ensure that the recommendations of corridor plan(s) included in the State Guide Plan were appropriately reflected in local comprehensive plans, as required by statute.

4-2 GROUND TRANSPORTATION SYSTEM NEEDS

Highway Improvements

New and Upgraded Highways

Numerous major new highway facilities are not required, nor desired by Rhode Islanders. Only a few links are considered necessary, and all of these facilities have been identified in the short-term Transportation Improvement Program (TIP). Those identified for construction through the year 2006 are:

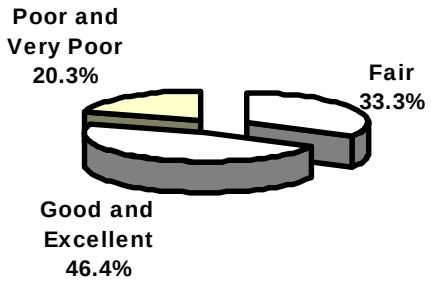
I-195 Upgrade, Providence
Quonset/Davisville Access Road, North Kingstown/East Greenwich
Waterfront Drive—No.End & Warren Ave Connector, East Providence/Pawtucket
I-295 Environmental Management District Interchange*, Johnston
(* Project included in TIP as "project to be funded by others")

A number of projects are programmed in the TIP under *Study & Development.* The results of this study phase will determine if these projects should advance to construction.

Highway Maintenance and Resurfacing

The public concern most often voiced during initial development of this plan (in 1997-98) was that state roadways are not properly maintained. In 1997 RIDOT estimated that of the approximately 1,300 miles of state highways, about 54 percent were in very poor, poor, or fair condition.

Highway Pavement Conditions, 1997

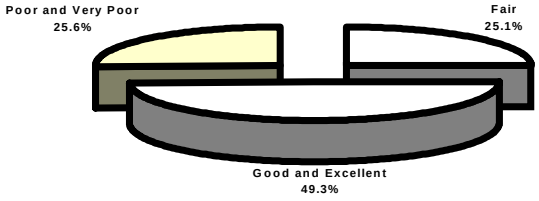


While many factors have contributed to this condition, there are two primary reasons. First, traffic and truck weight have increased significantly since most roadways were designed and built. While these increased demands were placed on roadways, funds allocated to state highway maintenance were not sufficient. Funding and staffing of RIDOT maintenance efforts had actually decreased during the 1990s. Additional resources are now being allocated to maintenance, but the damage to some roadways is extensive, and more costly rehabilitation will now be necessary in many areas.

A major effort began in 1999 to resurface much of the state highway system. In 1995, RIDOT estimated that there was a need to resurface 70 miles per year, which would renew road surface every 15 years. In the past, a minimal (no more than several million dollars) program was undertaken with state funds. In recognition of this need, the TIP now includes a resurfacing program that utilizes federal funds.

Beginning in 1999 $5 million was allocated to this program. The program was increased in the 2001-2002 TIP to $20 million per year through 2006. Initial indications are that the program has begun to redress the neglect of the past. The percentage of state-maintained road surfaces classified by RIDOT as being in “very poor”, “poor”, or “fair” condition declined from 54% in 1997 to 51% in 2000, and, the percentage rated as “good” or “excellent”, increased from 46% to 49%. With continuation of the TIP’s resurfacing program, the trend towards improved pavement condition should continue.

Highway Pavement Conditions, 2000



Crack Seal Program

As pavement ages, the impacts of heavy traffic and weather cause the pavement to crack. Cracks allow water to enter the pavement and the highway base, causing further deterioration. This deterioration can be prevented to some extent by sealing the cracks in a timely manner. For many years, funds were not allocated to crack sealing at RIDOT. This effort is estimated to require several million dollars of funds each year. In the 2001-2002 TIP, a crack-sealing program was initiated as part of the Pavement Management Category, and will be continued through 2006. In the first year of this program (2001) over $400,000 was authorized for pavement crack sealing.

Highway Drainage

Pollutants are generated from, and enter onto, the highway right-of-way from many sources. Motor vehicles leak heavy metals, oil and grease, and other substances (including antifreeze and brake fluid) onto roads. Commodities carried by trucks may leak on the road. Exhaust pollutants fall to the road and adjacent land. During winter, sand and salt are spread on the road. Pavements, brakes, and tires wear, and small particles are freed into the roadway environment. Soil erosion during and after construction of roads, highways, and bridges can also contribute large amounts of sediment and silt to runoff waters. In addition to roadway-generated pollutants, runoff from land adjoining the roadway can include pollutants, such as agricultural runoff, which drain onto the highway.

All of these pollutants are washed off the road when it rains and snows. On many roads this runoff flows to ditches and grassy areas along the roadsides. Water penetrates through the ground, and the soil acts like a filter, trapping many of these pollutants. On other roads, drainage systems pipe this polluted water to streams, rivers and bays. Without any treatment, water quality is impacted, potentially leading to fish kills and other ecological problems.

While both road construction and operation of roads contribute to environmental pollution, there are ways to minimize the impact. Pollution minimization begins with planning considerations for construction, and extends to controlling non-point pollution on operating roads and highways (and on adjoining lands which drain onto roadway drainage systems). Federal requirements for these controls were included in the 1972 Costal Zone Management (CZM) program and are reflected in the Phase II Storm Water Regulations (NPDES II and RIPDES II) currently being implemented by USEPA and RI DEM. These controls will create responsibilities for state and local governments, and for certain private sector activities affecting land disturbance and runoff.

Preventing runoff pollution from road, highway, and bridge construction and operation requires planning, education, inspection, and maintenance. Drainage designs that reduce overall runoff by maximizing infiltration should be encouraged. Erosion and sediment control plans and runoff control plans that incorporate the most appropriate and cost-effective “best management practices” are essential to effective pollution control. Highway personnel must be educated about the requirements of the erosion/sediment/runoff control plan. Inspection and enforcement authority are necessary to ensure awareness of and compliance with the adopted practices. Finally, best management practices require regular maintenance to ensure that they perform optimally. Once a system has been constructed or improved, responsibility for maintenance should be assumed by the state or the locality.

Problems with highway drainage can also affect highway safety. Ponding of water on highway surfaces creates poor traction for vehicles and can lead to loss of control. To correct unsafe roadway conditions caused by improper drainage, and to enhance environmental quality, the 2001-2002 TIP included $2 million per year for drainage improvements statewide under the Highway Safety Program.

Traffic/Safety Programs

Another area where there are significant needs is traffic and pedestrian safety programs. These programs manage traffic in congested areas and provide safety improvements. The following project types are included:

Hazard Elimination	Drainage Improvements
Signing Improvements	Lighting Repair and Improvements
Repair/Upgrade Signals	Striping
Signal Construction	Hardware Replacement
Arterial Signalization	Traffic Monitoring Stations
Overpass Snow Protection	Repair of Damaged Safety Devices
Repair Call Boxes	Signing Improvements/Inventory Update

The TIP allocated $20 million each year to this area.

RIDOT completed a statewide inventory of state-owned traffic signals. A modernization program to upgrade red, flashing yellow, and green signal lights to light-emitting diodes (LEDs)

is underway. Replacement increases the lifetimes of signal lights, decreasing maintenance, and enhances signal visibility, increasing safety. The new LEDs are also more energy-efficient.

Bridge Maintenance

RIDOT maintains a total of 603 bridges; local governments maintain 146 bridges. Statewide, a total of 749 bridges require ongoing maintenance. About 50 percent of all bridges are considered in good condition and need only routine maintenance. The remaining 50 percent have structural deficits, or functionally obsolete features.

Rhode Island Bridges
(greater than 20' long)

	State-maintained		**Locally maintained**	
Total Bridges:	603	100%	146	100%
Structurally sound	447	74	98	67
Structurally deficient	54	9	13	6
Structurally deficient and functionally obsolete	102	17	35	24
Structurally sound but functionally obsolete	206	34	49	33

Source: RIDOT

Structurally deficient - deterioration of the physical condition of the elements that make up the bridge

Functionally obsolete - substandard geometrical condition of the structure (outdated design)

Structurally deficient and functionally obsolete - a combination of both of the above

Given the large number of historic bridges in Rhode Island, it is to be expected that a considerable fraction would be classified as functionally obsolete. The primary cause of functional obsolescence is deck geometry or under clearances that do not meet contemporary design standards. Approximately 80% of bridges classified as “functionally obsolete” are considered to be performing satisfactorily (good traffic flow, low accident rates), and are not programmed to be worked upon, unless they are also structurally deficient. Decisions to replace or rehabilitate bridges to address obsolescence must also consider the impact on historic resources and community character.

Of the 204 bridges that are structurally deficient or structurally deficient and functionally obsolete, a total of 84 (41 percent) are posted, limiting vehicle weight, of which 14 (7 percent) are closed.

Rhode Island Bridges-Posted

	State-maintained	Locally maintained
Posted	42	28
Closed	9	5
Total	51	33

Over 8 percent of all state-maintained bridges are posted as well as 23 percent of locally maintained bridges.

As with highway pavement, limited resources have been allocated to bridge maintenance over the past 20 years. Without ongoing maintenance efforts, many bridges have deteriorated and now need expensive rehabilitation. When bridges become structurally deficient, they are either closed or weight restrictions are placed on vehicles that can cross them. This impacts local travel, commerce, emergency vehicle service, and school buses.

Several major bridge projects must be completed within the timeframe of this plan. Both the Sakonnet River Bridge and the southern span of the Washington Bridge have been found to be seriously affected by deterioration due to age and lack of proper maintenance over the years. Both spans are critical links in the state and regional transportation systems.

The Washington Bridge carries eastbound traffic of Interstate 195 over the Seekonk River, and also is a link in the East Bay Bikepath. RIDOT has determined that interim repairs to the Washington Bridge's southern span must begin immediately and a replacement span put in place within seven years.

The Sakonnet Bridge carries approximately 30,000 vehicles per day (1999) and is a link in state Route 24, a limited access route that connects the Aquidneck Island communities to the mainland of Rhode Island and southeastern Massachusetts. An environmental analysis to assess options for the Sakonnet span is to be completed by RIDOT in 2001; this will determine whether a major rehabilitation or complete replacement should be pursued.

Beyond the Sakonnet River Bridge and Washington Bridge projects, other significant bridge rehabilitation needs of the State system include the Route 6/10 interchange bridges in Providence, and bridges of I-95, I-195 and I-295.

RIDOT has developed a bridge washing program to remove salt and sand, reduce corrosion and maintain the functional life and safety of bridges. This program will be expanded to provide for the cyclical, periodic cleaning of all of Rhode Island's bridges.

Because of the importance of bridges, the TIP allocates $35 million a year to bridge rehabilitation. However, even this will not be enough if additional state funds are not allocated to normal bridge maintenance.

Local Roadway Management Program

Rhode Island cities and towns maintain about 4,700 miles of road. Like the state, they have not had sufficient funds to maintain their systems. Many streets have been constructed by developers, then turned over to municipalities. While property tax revenues increase, pressures and costs rise for services like schools, police, and fire services. The need for pavement maintenance does not occur for ten or more years. By that time, increased property tax revenues have long been assimilated into the municipal budget.

Testimony received for the plan update, indicates that, in addition to pavements, municipal needs also include sidewalk maintenance and traffic calming projects, to support walkable community objectives. Local roadway maintenance needs could probably absorb a high level of funds, as indicated by continuing requests from local officials. It is not possible for the state to meet all needs, but a limited cost-sharing program, similar to that provided in other states, could supplement local efforts, and improve the overall condition of the transportation system. Municipalities could continue to fund pavement management at existing levels, supplemented by state funds. A program of $5 to $10 million could be initiated and then reevaluated.

Highway Lighting

Adequate highway lighting can be an important factor in highway safety, particularly for older drivers. As shown in Part 611-3, Rhode Island's over-65 population is projected to increase. As people age, visual performance becomes progressively poorer. The older motorist requires a more distinct target to see. Glare makes it difficult or impossible to distinguish objects, until re-adaptation to the prevailing light level.

Glare can be a safety problem for the driver. It causes annoyance, discomfort, and loss of visual performance and may cause fatigue, which can result in driver error. Glare can be so intense that for an appreciable time after it has been removed no object can be seen or easily distinguished.

In some areas of Rhode Island light pollution has become recognized as an important aspect of roadway operation. The former Blackstone Valley Electric Co. (now part of Narragansett Electric/National Grid) developed a program to replace for streetlights with more efficient and safer lights known as full-cutoff luminaires. These reduce the level of light pollution, save energy; increase safety for pedestrians, motorists, and bicyclists; and produce a more aesthetic and pleasing environment.

In addition to the problem of too much light, another significant safety issue, especially for the older driver, is not enough lighting. Repair or replacement of aging and obsolete highway lighting infrastructure is needed for some highway segments. There are stretches of state highways and some limited access "on and off" ramps where existing lights are not working. New or improved lighting may also be needed in some locations, such as formerly low volume roads or rural areas where traffic or population has increased in recent years. State highway lighting adequacy should be periodically reassessed to determine areas where new or enhanced lighting is necessary.

RIDOT's Maintenance Division has completed an inventory of state highway lighting infrastructure. Funding for highway lighting repair and improvements has been included in the 2001-2002 TIP's Traffic/Safety Program (see above), and projects are underway to replace lighting on I-95 at exit 6A with full cut-off lighting, and to upgrade lighting on Routes 99 and 146 in Providence, North Providence, and Lincoln. RIDOT has also applied for funding to replace and improve lighting on Route 138 from the Newport Bridge to US 1 in North Kingstown.

Commercial Vehicle Parking

Lack of sufficient parking areas for large trucks and other commercial vehicles can create a safety hazard. Interstate truckers are required to take periodic rest stops to reduce fatigue and maintain safety. If parking areas are not available, trucks may improperly park along roadsides, creating hazards. To conform to section 4027 of TEA 21, in 2001, RIDOT and the Federal Highway Administration completed a Commercial Vehicle Parking Supply and Demand analysis for National Highway System (NHS) segments in Rhode Island. This study found that, on a statewide level, there is a current (1999) shortage of 307 commercial vehicle parking spaces along NHS segments in Rhode Island, and that, absent action to increase supply, the shortfall would grow to between 298 and 809 spaces (depending upon future demand growth assumptions) by 2019. I-95 was found to be the most severely impacted NHS route, due to high truck volume and limitations on truck parking. The planned re-opening of the rest areas on I-295 is included as an action Rhode Island will take to alleviate the deficit somewhat. Improved signage along the I-95 corridor in southern Rhode Island will also provide truckers with better guidance on available parking facilities.

Other options to meet the supply shortfall for I-95 include making underutilized park n' ride lots available for commercial vehicle parking, and exploring the potential for expansion of existing rest areas to include commercial vehicle parking. Solutions similar to these will also be considered for other NHS corridors in Rhode Island. In addition, working with the private sector, and neighboring states was anticipated to develop regional solutions.

Transit Improvements

In 1998, RIPTA completed a comprehensive transit and paratransit study, and "Transit 2000" proposals that provided new transit service models for the future. RIPTA maintains an on-going planning program to optimize transit service. Regular evaluation of routes allows adjustments to address passengers' service needs within the system's financial constraints. Additional non-fixed route transit zones will be identified to expand transit operations in suburban and rural areas. RIPTA will review operational service standards.

RIPTA has purchased equipment to assist monitoring of transit operations. Eight buses and two trolleys will have automatic passenger counting and vehicle locator systems. Data from this equipment are being integrated in the planning process to provide accurate, cost-effective information on bus operations and ridership.

Transit Buses

Transit buses should be replaced after a ten or twelve-year useful life. The schedule for replacement is based on the age structure and condition of the existing fleet. Additions and alterations in the fleet composition are also considered as changes occur in services offered. As older buses are replaced, purchases of alternative fueled vehicles should be continued in support of federal and state clean air objectives.

A critical issue with bus replacement in the past, as well as today, is the lack of availability of match sources to the federal funding that is available.

Paratransit

The vans used for service to elderly and disabled individuals have a five-year useful life. The RIde Program, the state's coordinated paratransit program, has a fleet of 107 vehicles in revenue service (in 2001). There are approximately 100 additional vehicles purchased by RIDOT providing paratransit services throughout the state. With a more coordinated effort it is estimated that the current total state service can be provided with a fleet of 125-150 vehicles. There may be some increase in demand for services within the state (e.g., ADA and welfare-to-work).

As part of the RIde Program, RIPTA has purchased vehicles and leased them to carriers under contract with RIde. The carriers pay RIPTA a mileage fee for use of the vehicles. Proceeds from this fee are deposited into a restricted receipt account (Paratransit Capital Fund) to be used to match the replacement vehicle. This stable program of match funding is working and should continue.

RIPTA Facilities

RIPTA will complete construction of its new bus maintenance garage at its Elmwood Avenue facility in the summer of 2001. RIPTA will continue to review options for upgrading other facilities, especially the bus storage building. A new satellite facility in Middletown was completed in 1999.

Terminals and On-the-Street Amenities

RIPTA has three major terminals (Providence, Pawtucket, and Newport). The most important of these is Kennedy Plaza in Providence, which is undergoing a major reconstruction in 2001-2002. The renovated Kennedy Plaza facility, funded in part by the CMAQ program, will have an indoor waiting area and restrooms for passenger convenience, and will allocate space to private intercity buses. Other terminals of significance in the RIPTA network include the Gateway Center (Newport) and the Visitor Center (Pawtucket). Both provide for indoor waiting and amenities for passengers.

Other transfer points will be needed in Woonsocket, Warwick, and South County. Some of these are stops without the passenger amenities found in Newport and Pawtucket. Other transfer centers, including one under consideration for Olneyville in Providence, will be located throughout the system as needs are identified. All transfer centers will be ADA-accessible and serve to transfer passengers between the demand-responsive and fixed-route systems.

Funding for these terminal facilities will probably come from the CMAQ program, which is matched by RIDOT bonds. With match funding pressure being applied on RIDOT projects, this may not be a long-term source of match funding for RIPTA projects.

RIPTA also needs to continue to address the “on-the-street” needs of its passengers. Programs for locating, providing, and replacing bus stop signs and shelters, and for making route and service information available to customers should continue.

Express Travel

The *Express Travel* rideshare program is operated by RIPTA under contract with RIDOT. The purpose of the program is to attract commuters to carpool, vanpool, and enhanced bus services.

The average auto occupancy for all trip purposes in Rhode Island is estimated at 1.2 persons per auto; for the work trip, 1.1 persons per auto. Low vehicle occupancy rates for work trips, along with standard working hours and concentrated locations of employment, are responsible for twice-daily peak-hour traffic congestion. Efforts to increase auto occupancy for work trips (carpool matching) would generate air quality and energy conservation benefits, which can greatly improve the efficiency of peak-hour travel. Carpooling is especially practical for work trips to suburban and out-of-state employment centers that lack peak-hour bus service. These trips would be diverted from single-occupant auto travel rather than transit or vanpooling.

RIPTA has developed 43 carpools to date, and expects to increase this number to 100 by the end of 2001. Many Rhode Islanders who work at General Dynamic's Electric Boat shipyards also take advantage of vanpools operated by the Connecticut DOT's "Easy Streets" program.

Vanpools are especially suited to suburban employment sites that are not served or are inadequately served by transit. Characteristics that facilitate formation of efficient vanpools are large employee bases, concentration of employee residences in a few areas, and longer-than-average trip lengths.

The State of Rhode Island, as the largest employer, needs to be targeted for special promotions to enable employees to choose an alternative to the single-occupant auto for work trips. Policy changes in the provision of free and low-cost parking must be considered to provide success to this type of endeavor.

Funding for this program will be ongoing from the CMAQ program.

Commuter Parking

Commuter parking (park-n-ride) lots, coordinated by RIDOT and RIPTA, provide staging areas for commuters to leave their cars and commute to work by bus, carpool, or vanpool. A total of 26 lots are located throughout the state, some of which are not located in prime commuting areas. To enhance use of these type of facilities, new lots need to be located in prime commuting areas and along major transportation corridors to encourage a greater percentage of single-occupant auto users to try another mode of travel. RIPTA provides scheduled bus service to 26 park-n-ride locations.

Funding for this program has been primarily for leases of private parking areas. Funding to construct new facilities and to provide for passenger amenities at some of the existing facilities must be determined.

4-3 PROGRAMS

The transportation plan provides a long-range framework for addressing projects. The short-term element of the plan is the TIP. The TIP is part of the long-range plan and is incorporated by reference in this document. The current TIP shows projects that have been identified for the FY 2001-2006 period.

The plan and the TIP have been analyzed and found to conform with the State Implementation Plan (SIP) for air quality. The plan analysis is shown in Appendix A.

The current TIP is included by reference as Appendix B. It is also appropriate to describe the policy that guides the development of highway and transit TIP programs, as follows.

Highway

In recognition of the need to preserve the existing transportation system, the State Planning Council has established a goal that 80 percent of available resources should be devoted to maintaining and managing the existing system. System expansion or new projects should be allocated less than 20 percent of resources, as a goal.

Highway improvements are grouped into four categories by purpose:

Study and Development: These funds are used to plan and study appropriate transportation project options and alternatives. The intent is to understand the scope and estimated cost of a project before programming it for construction.

System Preservation: This refers to maintenance of the existing transportation assets/service levels, such as highway pavement and bridge structures.

System Management: These projects relate to managing the existing system. Improving existing capacity while conforming with air quality, clean water, and other environmental standards through management techniques/improvements is the purpose.

System Expansion: These projects provide new service or expand existing services or facilities.

The 2001-2002 TIP reflects a *"Fix – It – First"* philosophy that puts primary emphasis on ***preserving*** and ***enhancing*** the existing transportation system; not on *expanding* the system's facilities. The program focuses primarily on maintaining Rhode Island's existing transportation infrastructure, while continuing to make limited strategic investments in new development. The vast majority (some 55%) of the TIP's System Expansion investments are programmed for rail expansion projects, including the Warwick Train Station and the Pawtucket layover facility. Traditional highway projects account for 32% of System Expansion investments programmed, and Bicycle System projects represent some 13%.

General Purpose Category	**FY 2001-02**
System Preservation	39%
System Management	33
Study and Development	4
System Expansion	19
Administrative	5
TOTAL	100

This plan anticipates that preservation and management of the existing system will continue as a first priority, and that the State Planning Council's expenditure goals of 80% for the System Preservation and System Management program categories will continue to be pursued over the long term.

Project categories have also been established to allocate resources. These categories indicate major emphasis areas.

Interstate	Pavement Management
Bridge	Air Quality
Highway	Enhancements
	Bicycle/Pedestrian

The TIP shows the allocation of projects and funds to these categories over the short term (six years, of which the first two have been approved). The plan shows this allocation through year 2020 in Part 611.6: Financing. The tables in Part 6 show funding committed to identified major projects that extend to years past 2006.

Transit

Major project categories have also been established for transit programs.

Transit Bus	Paratransit
Capital Equipment & Supplies	Fixed Guideway
Capital Maintenance/Preventive Maintenance	Operating Assistance
Land & Buildings	Planning

Again, long-term funding allocations have been made in Part 611.6: Financing. More detail within these categories is shown in the TIP through 2006 and reprinted in Appendix B. Unlike the highway program, no individual transit projects have been identified that extend past 2006. Even in the short term, in many years all funds have yet to be allocated to specific projects. Therefore, a category entitled "future projects" is shown in Part 6. The TIP process will allocate future project funding as projects are identified and approved by the State Planning Council.

RhodeWAYS -- Intelligent Transportation Systems Deployment

RhodeWAYS is Rhode Island's **I**ntelligent **T**ransportation *S*ystem **(ITS)** Program for transportation management. ITS is a combination of computer and communication technologies, as well as institutional partnerships, that make existing transportation systems operate more efficiently and safely. The ITS technologies include electronic message signs, closed circuit video equipment, highway advisory radios, computerized traffic signalization systems, road weather information systems, and other devices that are used to manage, monitor and control traffic at the Transportation Management Center. Also, ITS technologies include applications for fleet management, such as Automatic Vehicle Location (AVL), to improve transit and trucking operations.

In 2001, the RI Department of Transportation produced a draft ITS Strategic Deployment Plan. This twenty-year plan (2020 horizon) is summarized in Appendix D. It provides a mission, vision, goals, objectives, and implementation program (list of projects) that will enable **RhodeWAYS** to realize its goals in accordance with the goals of the long range ground transportation plan approved by State Planning Council (this plan).

The ITS plan proposes an ITS roadway system (see Figure page 4.28) based on traffic volumes and accidents to maximize benefits for the traveling public. This proposed system

would contain about 218 miles of state highways. The Plan identifies a series of projects that will help RIDOT achieve ITS goals for the state. These projects will directly support the implementation of Rhode Island's Statewide ITS Architecture, or will conform to this architecture. Although most of these projects are specific to RIDOT, several are multi-agency in nature. Proposed projects are presented in four broad groups, representing major categories of ITS: Advanced Traffic Management Systems (ATMS); Advanced Traveler Information Systems (ATIS); Advanced Public Transportation Systems (APTS); and Commercial Vehicle Operations (CVO). The ITS Plan identifies potential funding sources, discusses procurement strategies, recommends early action items to facilitate "mainstreaming" ITS projects, and presents a preliminary twenty (20) year ITS work program.

ITS HIGHWAY SYSTEM